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DEPARTMENT OF
PUBLIC WORKS

CITY OF SACRAMENTO
CALIFORNIA

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SACRAMENTO, CA
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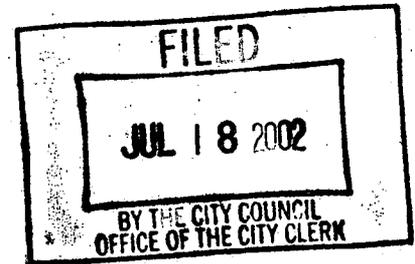
TECHNICAL SERVICES
DIVISION

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June 17, 2002

City Council
Sacramento, California

Honorable Members In Session:



SUBJECT: USE OF COOL PAVEMENTS ON SACRAMENTO STREETS

LOCATION AND COUNCIL DISTRICT: All districts.

RECOMMENDATION:

This report is for information only.

CONTACT PERSON: Dave Cullivan, Supervising Engineer, 433-6200
Jerry Way, Street Manager, 433-6381

FOR COUNCIL MEETING OF: July 18, 2002

SUMMARY:

Council member Tretheway requested staff research alternative paving materials and methods to reduce heat retention and increase heat reflectivity for possible application in a Sacramento location. This report gives a summary of staff research on two key alternative paving methods: Ultrathin Whitetopping (UTW) and StreetPrint.

COMMITTEE/COMMISSION ACTION:

None.

BACKGROUND INFORMATION:

Staff has investigated alternative paving materials for possible use in Sacramento to provide cooling benefits. Two alternatives were investigated in detail, Ultra-Thin Whitetopping and

StreetPrint. Over 12 articles were reviewed and contacts were made with 12 agencies. Seven agencies provided responses and a summary is included in attachment A.

ULTRA-THIN WHITETOPPING (UTW) is typically a rehabilitation technique that purposely seeks to bond a concrete overlay with existing asphalt. The process utilizes an existing base of asphalt that is milled down, leaving an ideal asphalt depth of 4 to 5 inches. An overlay of 3 to 4 inches of concrete (often mixed with fibers for additional flexibility and strength) is applied and closely spaced joints cut during the curing process. UTW was first experimented with in 1989 and grew slowly to 25 projects in 1994, 165 projects by 1998, and 293 projects at the end of 2001. Projects include airports, parking lots, rest areas, streets, and street intersections. Staff research included interviews with 7 different sources (see attachment A) and found only one UTW project installed for environmental reason. That project was reported successful but had no data on the cooling results.

The main advantage of UTW is **durability**. When no trench cutting occurs, some projects have been in place as long as 7 to 10 years and have required little or no maintenance. The American Concrete Pavement Association (ACPA) reports anticipated life to be 2 to 3 times that of asphalt. Staff research and interviews confirm this. UTW can also withstand certain washing solutions that remove oil and grease. Because of the longer life of UTW, there are fewer road closures for repair and less inconvenience for the public.

The main disadvantages of UTW are **initial costs** and **pavement repair** of trenchcuts. Utilities exist under streets throughout the City making UTW impractical. Cutting concrete is difficult and repair of UTW requires adherence to exact specifications. Since UTW is basically a Portland concrete overlay, the **curing time is lengthy** and allows **no traffic** for that time. The initial cost is approximately twice that of asphalt overlay. In addition the time to construct is much longer, an adequate asphalt base is required, and thermoplastic striping cannot be used.

Quality repairs: Our research indicated that the one jurisdiction that uses UTW regularly and has a substantial number of trench cuts found it impossible for contractors to repair their trench cuts adequately. They now have a maintenance section that does the UTW repairs and charges the contractor.

STREETPRINT/ STREETBOND is typically a beautification technique that combines the strength of cement with the flexibility of asphalt using a chemical and mechanical bond to add color and texture to asphalt. The process involves imprinting asphalt that is newly laid, milled and filled, or already in-place using infrared heat to soften the asphalt as needed. A pattern is stamped on the hot asphalt and a coating is applied. The coating is polymer-modified cement that is water resistant and available in a variety of colors. The StreetBond coatings can be applied to a cleaned asphalt surface without the heat and stamping process. StreetBond coatings are used in a number of entertainment and commercial venues. These typically have high pedestrian and low vehicle traffic. The City has experience with StreetPrint and StreetBond coatings at crosswalks.

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The main advantage of StreetPrint/StreetBond coating is **aesthetics**. It is resistant to water, oil and gas. It is available in various colors and thermoplastic can be applied.

The major disadvantages of StreetPrint/StreetBond coating are the **cost** and **lack of durability**. Application cost is about \$10.00 per square yard and the asphalt base must be structurally sound. In addition staff has noticed that the coating at 26th Street and J Street has begun to wear off in the wheel tracks after just 4 years. This will require re-coating in the near future.

Conclusion: Because of the cost, curing time, base requirements, striping issues, special surface preparations, and repair issues, staff believes wide scale application and/or extensive use of these alternatives is unlikely. Both Ultrathin Whitetopping and StreetPrint/StreetBond coating may be beneficial at specific locations that take advantage of their specific attributes and justify their increased costs. Over the next year, staff will investigate special locations for test application of these black asphalt alternatives.

FINANCIAL CONSIDERATIONS: None. This report is for information only.

ENVIRONMENTAL CONSIDERATIONS: None.

POLICY CONSIDERATIONS: None.

ESBD EFFORTS: No goods or services are being purchased under this report.

Respectfully submitted,


Jerry Way
Street Manager

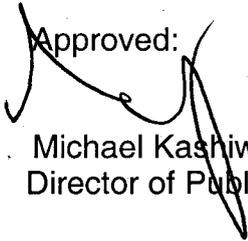
Approved


Gene Moore
Maintenance Services Manager

RECOMMENDATION APPROVED:


Bob Thomas
City Manager

Approved:


Michael Kashiwagi
Director of Public Works

Ultrathin Whitetopping Survey Summary

Agency or Company	Project	yrs in place (oldest)	repairs	problems	benefits/plans
New York State Thruway	service areas	4	none	none	truck engine spills cleanable, do not degrade surface integrity; new projects at toll booths
Tennessee Dept. of Transportation	rural town signalized intersection	10	one 4X4 section, 7 yrs old	construction time: intersection down; thermoplastic would not stick;	projects underway in Nashville, then Knoxville
City of Independence, Missouri	intersections and approaches	5	watermain break, cut & repair: broke out concrete & repaired, no bond, ok after 1 yr	none	more planned, City Council happy with no repairs since laid
City of Shawnee, Kansas	approaches to intersections	6	one 3X3 panel, holding well	one failed project, subgrade failed, base not sufficient, recommends core samples; some signal loops failed - reinstalled at surface	good PR, less visibility and inconvenience compared with annual asphalt repair; doing 2-3,000 yards more each yr.
City of Lenexa, Kansas	intersections and approaches	6	one bore done for phone, nothing else	getting street marking to stick, esp. transverse (most successful with spray epoxy)	prevents rutting/washboarding at approaches; with build up on edges prevented water deterioration; planning 40,000 ft. downhill approach
Santa Monica	short residential block	4	sewer project, cut open row of panels, did slurry and full section concrete to replace panels	none	done for environmental test, no data available. Initial public response was positive; new project this yr. will be intersection and a curb-to-curb
City of Brampton, Ontario, Canada	downslope to intersection, 4 lanes including turn in ea. direction	5,4,3	many cuts; initial 67% failure on repairs. City took over repair following specs and charge back utility	one failure, core samples did not detect insufficient base. Also early project had edge curl causing cracking	Site selection has big impact, important to anticipate utility cuts and to determine adequate asphalt base; plans more projects over next few yr+